PHYS 521 Quantum Mechanics (I)

Syllabus

Objectives: To learn the fundamentals of quantum mechanics --- the basic postulates of QM, matrix and wave mechanics, spin and orbital angular momentum, time evolution, wavepacket, density opertor, symmetry.

Course Credit: 3 semester hours
Meeting Times: Tuesday and Thursday, 1:00-2:15pm
Classroom: HBH 227

Format: A lecture course with weekly problem sets, a midterm exam and a final exam.

Textbook: Modern Quantum Mechanics (2nd Edition), J.J. Sakurai and J. Napolitano, Addison-Wesley, 2011.

Course web page: https://owlspace-ccm.rice.edu/portal/site/PHYS-521-001-F14

Course Instructor

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Homework and Grades

I plan to assign a homework set each week, usually due at the beginning of class one week later. Homework sets will be distributed in class but they will also be available from the course web page.

Homework Policy: You are encouraged to discuss the homework problems with your PHYS 521 classmates and with the instructor and the graders, but you must write up your solutions *independently*. Of course, you must not copy from anyone else's solutions.

Late Policy: The grade for late homework will be multiplied by a decaying exponential with a time constant of five days. After 5 days, the homework will not be accepted and you will receive zero point for that homework set. Late homework must be delivered to the grader or the instructor for that problem set and the student must write "Late" and the date and time on the front page.

Grading Weights:	Homework:	30%
	Midterm Exam:	30%
	Final Exam:	40%

Course Content

I plan to cover Chapters 1 to 5 in the textbook.

1. Fundamentals of QM: Stern-Gerlach experiment, quantum states and Hilbert space, observables and operators, commutation relations and uncertainty rules, pure and mixed states, density operator
2. Quantum Dynamics: Schroedinger, Heisenberg and Interaction pictures, quantization of harmonic oscillator and the creation/annihilation operators, propagators and Feynman path integrals, potential and gauge transformation
3. Theory of Angular Momentum: rotation and angular momentum operator, commutation relations and the spectrum of angular momentum, spin and SU(2) group, orbital angular momentum and central potential, addition of angular momenta and Clebbsch-Gordan coefficients, tensor and Wigner-Eckart theorem
4. Symmetry in QM
5. Perturbation Theory

Any student with a disability requiring accomodations in this class is encouraged to contact the instructor after class. Additionally, students should contact the Disabled Student Services office in the Ley Student Center.

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